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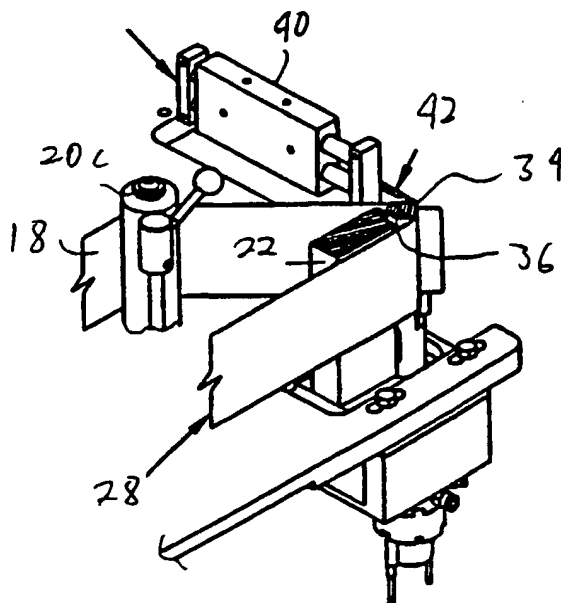
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: LABELLING APPARATUS



(57) Abstract: A labelling system is disclosed that includes a selectable application unit for selectively applying a label to an article. The selectable application unit includes a first application portion for applying a label from a web onto an article, a second application portion for preventing the application of a label from a web onto an article, and a control unit for selectively engaging either of the first application portion or the second application portion.

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LABELLING APPARATUS

PRIORITY INFORMATION

This application claims priority from provisional application Ser. No. 60/141,107
5 filed June 25, 1999 and is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

The invention relates to the field of labeling machines in which labels are transferred from continuously moving backing strips via rotating applicator drums to
10 articles such as food or medicine containers being conveyed through a labeling station.

The invention is concerned in particular with preventing defective labels from being applied to such containers, with minimal attendant interruption of machine operation. Defective labels include, but are not limited to, labels that are miscoded by printing devices such as hot stamp printers, laser coders (e.g., dot matrix and mask printers),
15 thermal transfer and direct thermal printers and the like. Any miscoded, misprinted or otherwise defective labels should not unknowingly be applied to articles because doing so may result in a large volume of articles being scrapped, or may potentially result in confusion and/or harm if undetected by a consumer.

Packagers of food and pharmaceutical products demand high levels of accuracy and
20 reliability in the labeling process. Accordingly, systems have been developed for detecting the presence of incorrect labels both prior to and following label application.

Generally, labeling machines that provide labeling error detection prior to the application of the labels onto the articles, are preferred to those that provide error detection following application. Labels need to be retained when codes that are printed at point of inspection
25 and/or pre-printed codes cannot be validated by devices such as bar code readers, vision system sensors, photo eye sensors, label presence devices or other known detection devices. Labels also need to be identified when data printed on the labels is not correct as determined by known detection devices that may be coupled to a computer system including a database storage unit.

30 U.S. Patent No. 5,405,482 discloses a labeling machine that detects erroneous labels prior to application, and removes identified erroneous labels from articles following application. The articles from which the erroneous labels have been removed, however, must be identified and separated from the properly labeled articles. These identified

articles may then be re-used or thrown away as is appropriate under the circumstances. Such additional steps require additional time and resources.

It is desirable to provide a labeling system in which erroneous labels are identified prior to application to articles and in which erroneous labels are not applied to articles.

5 It is also desirable that such a system be efficient and cost effective.

SUMMARY OF THE INVENTION

A labeling system including a selectable application unit for selectively applying a label to an article. The selectable application unit includes a first application portion for
10 applying a label from a web onto an article, a second application portion for preventing the application of a label from a web onto an article, and a control unit for selectively engaging either of the first application portion or the second application portion.

In certain embodiments, the system includes a rotary tool having peel portion and a large radius portion, and in further embodiments, the system includes a linearly
15 actuatable support blade for facilitating separation of labels from the web.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an illustrative isometric view of a labeling system incorporating a label application and removal mechanism in accordance with an embodiment of the invention;

20 FIG. 2 is an illustrative isometric view of the label application and removal mechanism shown in Figure 1 shown in the label application mode, with a portion of the rotary peel tool removed for clarity;

FIG. 3 is an illustrative isometric view of the label application and removal mechanism shown in Figure 1 shown in the label withholding mode, with a portion of the
25 rotary peel tool removed for clarity;

FIG. 4A is an illustrative top view of the label application and removal mechanism shown in Figure 1 shown in the label application mode;

FIG. 4B is an illustrative side view of the label application and removal mechanism of Figure 4A;

30 FIG. 5A is an illustrative top view of the label application and removal mechanism shown in Figure 1 shown in the label withholding mode; and

FIG. 5B is an illustrative side view of the label application and removal mechanism of Figure 5A.

The drawings are referenced for illustrative purposes only and are not necessarily to scale.

DETAILED DESCRIPTION OF THE INVENTION

5 As shown in Figure 1, a labeling system 10 in accordance with an embodiment of the invention includes a label feed supply that supplies a continuous web of labels to articles. The web is fed from a source (not shown) to the area generally indicated at 12, labels are applied to articles at the area generally indicated at 14, and the web liner is rewound at a rewind station 16. Labels are dispensed over a peel surface and applied to
10 products directly or by a secondary device such as a print – and – apply applicator tool, drum, vacuum belt, or other application device. Labels in most applications consist of face stock that is fully printed, partially pre-printed or blank (and printed on demand). The face stock of labels is releasably attached to a liner by an adhesive or other known means. The liner is used to transport and dispense the label, and the liner is collected at
15 the rewind station 16 after the label is dispensed. The liner is constructed in such a way that the label may be peeled off the liner. The remaining web without the labels is collected at the rewind station 16, and may be discarded as scrap. The peel surface is generally formed of a wear resistant material and is in the shape of a sharp radius edge.

The system typically pulls and/or pushes the web through rollers as discussed below. The
20 purpose of the peel surface is to change the direction of the label relative to the liner in order to decisively separate the label from the liner. A motor or other generally known means such as a stepper motor, AC/DC motor or servomotor coupled with a gap sensor is used to drive the feed roll system to precisely feed and position the label on the peel surface for application.

25 In particular, the web 18 (including the labels 24) travels around pulleys 20a, 20b and 20c before arriving at the label application / withholding station 22. The labels on the web 18 may either be pre-printed, printed at a printing station in the system, or may be unprinted. A label 24 is applied to an article as the web with the label travels over a peel surface 26. Specifically, when the web 18 and label 24 travels over the peel surface 26,
30 the label 24 extends outward from the peel surface 26 as shown, and is received by an article (not shown). Following application of the label to the article, the remaining portion of the web (which is now scrap 28) is drawn around a drive roller 30, and around take – up rollers 32a, 32b, 32c and 32d before reaching the rewind station 16.

In order to remove labels prior to peeling and prior to application to products, the system effects a change in the operation of the peel surface from a peeling device to a non-peeling device. This change is effected on - demand, and in a controlled manner to permit peeling good labels while not peeling defective or erroneous labels. The system includes
5 a rotary peel tool 34 that automatically rotates 180 degrees such that the sharp radius peel surface 26 is turned away from the application area 14, and a large radius surface 36 is exposed to the application area 14. The rotary peel tool 34 is designed and shaped such that when it is rotated, the linear length and/or tension of the web remains controlled. This prevents the web from becoming pulled or buckled during rotation of the tool 34.

10 During operation, if an incorrect label is identified by a sensor 38, then the tool 26 rotates 180 degrees such that the sharp radius portion 34 is turned inward, and the large radius portion 36 is then exposed to the application area 14. When the incorrect label 24 and web 18 travel over the large radius portion of the tool 26, the label 24 will remain with the web and travel with the scrap portion 28 of the web 18. Once the incorrect label
15 has passed by the application area 14, the tool 26 rotates again 180 degrees such that the sharp radius portion 34 is again exposed to the application area 14. The tool 26 may be rotated by any type of motor, e.g., pneumatic, hydraulic, electrical, stepper etc. The rotary peel tool 26 may be rotated to any known fixed position in both directions and/or to variable positions dependant on the a number of factors including label construction.

20 In further embodiments, an additional device 40 may be used to facilitate the transfer of a label from the peel surface to an article. As also shown in Figures 2 and 3, and as shown in further detail in Figures 4 and 5, the device 40 includes a retractable support blade 42. As shown in Figures 4A and 4B, when the tool 26 is rotated such that the sharp radius portion 34 is exposed, the end 44 of the retractable support blade 42
25 contacts the label 24 as it is being separated from the web. The end 44 of the blade 42 supports the label, and facilitates directing the label away from the web. In certain further embodiments, the end 44 of the blade 42 may include a curved outer surface such that the center of the end of the blade contacts the labels. This may cause the labels to undergo a reverse bend just prior to peeling, and is helpful for labels that undergo a set due to over
30 - tensioning at the point of manufacture of the label stock. Such a device may also be helpful in applications involving labels that include a relatively strong adhesive.

The support blade 42 operates automatically and in timing with the rotary peel tool 26. During operation, when the sharp radius portion 34 of the tool 26 is exposed and

labels are being applied to articles, the end 44 of the blade contacts the exposed surface of the label (opposite the adhesive) and facilitates the separation of the label from the web.

When an erroneous label is detected, the blade 42 is retracted (as shown in Figures 5A and 5B) at the same time that the tool 26 is rotated such that the larger radius portion 36
5 of the tool 26 is then exposed to the application area 14. Once the erroneous label has passed toward the rewind station 16, the tool 26 rotates back and the blade 42 is re-extended.

Depending on the type of article label application system employed, the act of skipping the application of an incorrect label to an article, might result in an article being
10 un-labeled, or it might be labeled by the label following the erroneous label on the web.

The above disclosed embodiments are intended to be exemplary of the invention, and not limiting.

What is claimed is:

CLAIMS

1 1. A labeling system including a selectable application unit for selectively applying
2 a label to an article, said selectable application unit including a first application portion for
3 applying a label from a web onto an article, a second application portion for preventing
4 the application of a label from a web onto an article, and a control unit for selectively
5 engaging either of said first application portion or said second application portion.

1 2. A labeling system for applying labels to articles to be labeled, said labeling system
2 comprising:

3 supply means for supplying a stock of labels in the form of a web;
4 peel means for permitting labels on the web to be separated from the web;
5 sensor means for detecting the presence of an erroneous label on the web; and
6 correction means for preventing the application of the erroneous label to an article.

1 3. In a labeling system wherein pressure sensitive adhesively backed labels are
2 releasably adhered to a backing strip moving along a path from a dispensing roll to a take
3 - up roll, a selectable application unit for either one of applying labels to articles and
4 preventing labels from being applied to articles responsive to an erroneous label sensor
5 output signal.

1 4. A labeling system for selectively applying labels to articles, said labeling system
2 including a rotatable tool including a first surface portion that is characterized as having
3 a small radius and including a peel point, and second surface portion that is characterized
4 as having a relatively large radius portion, said rotatable tool being arranged to be
5 rotatable between at least two positions such that either of said first and second portions
6 may be exposed to a label application area.

1 5. The labeling system as claimed in claim 4, wherein said system further includes
2 a support element for contacting the labels as they are separated from the web to facilitate
3 the separation of the labels from the web.

1 6. The labeling system as claimed in claim 5, wherein said support element includes
2 a linearly actuatable support blade.

1 7. The labeling system as claimed in claim 6, wherein said support blade includes a
2 distal end that is curved to facilitate separation of the labels from the web.

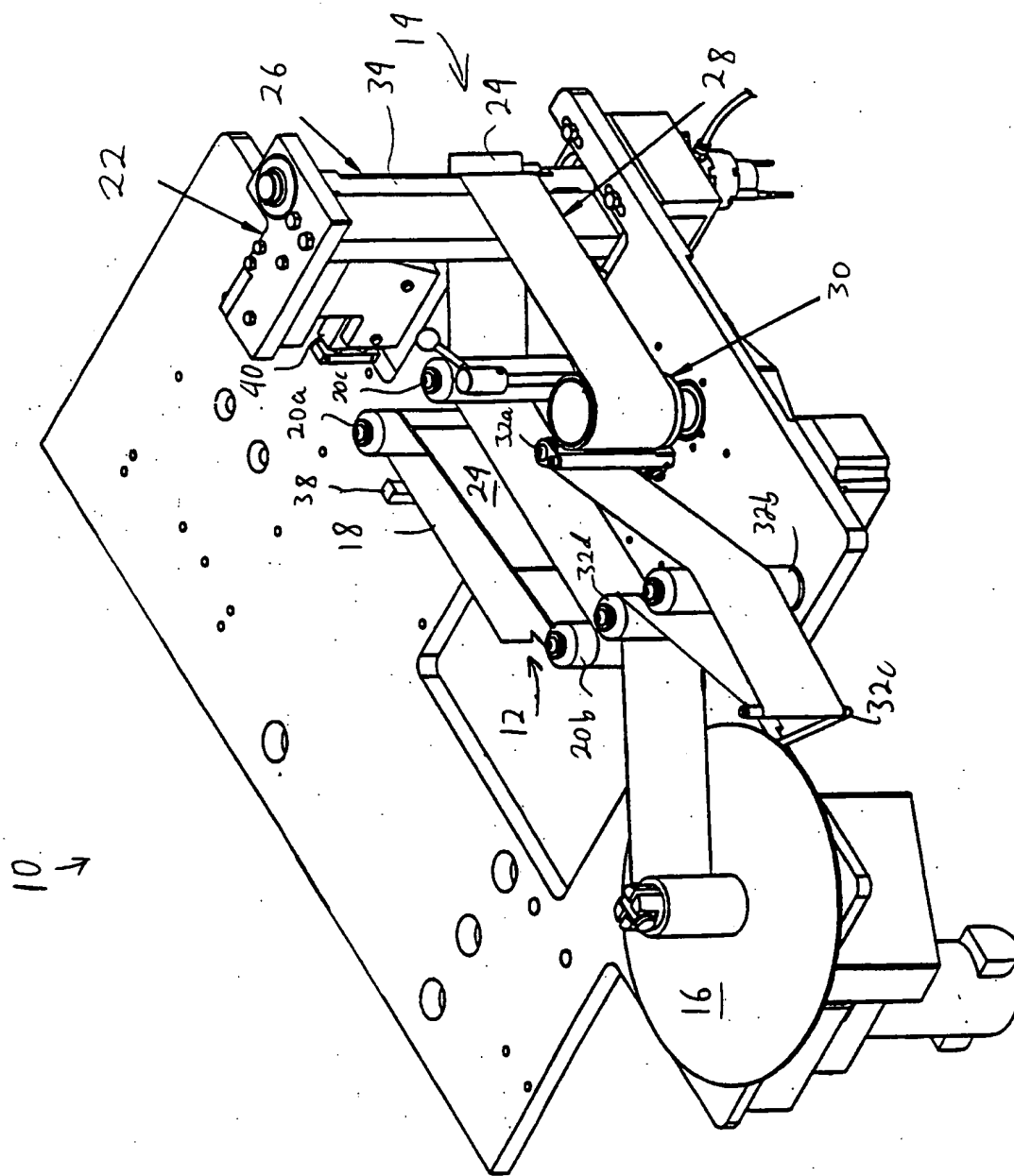
1 8. A method of preventing the application of an erroneous label to an article in a
2 labeling system, said method comprising the steps of:

3 detecting the presence of an erroneous label on a web;

4 actuating a rotational tool to remove a peel surface from the path of the detected
5 erroneous label;

6 positioning a non-peel surface in the path of the detected erroneous label; and

7 causing the erroneous label to be re-directed such that it is not applied to an article.



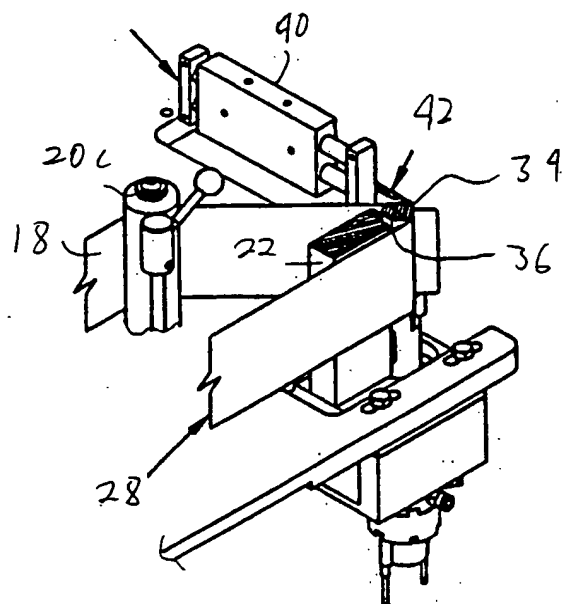


FIG. 2

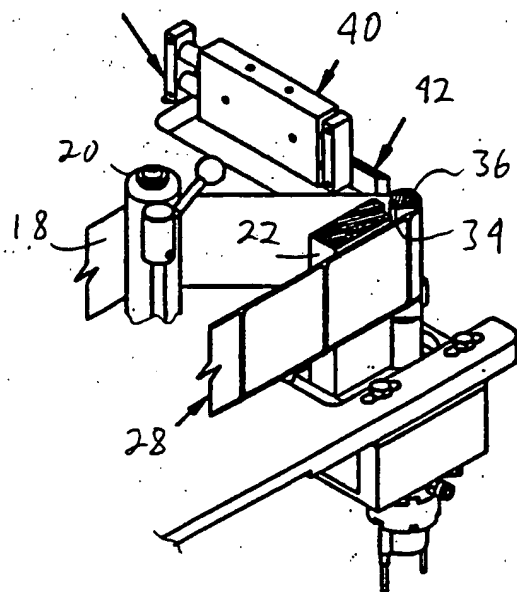


FIG. 3

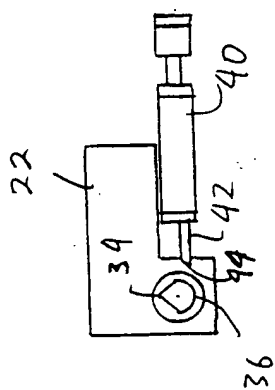


FIG. 5A

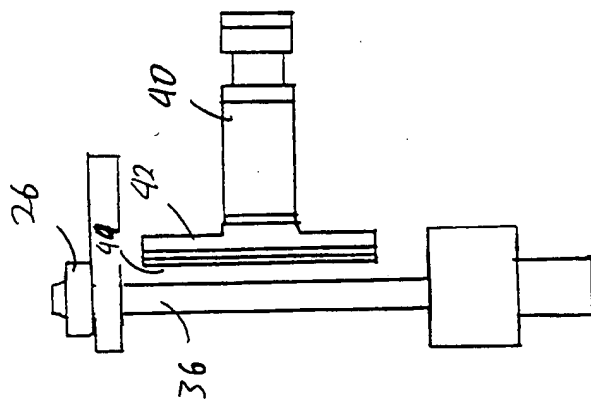


FIG. 5B

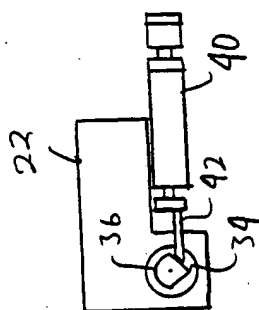


FIG. 4A

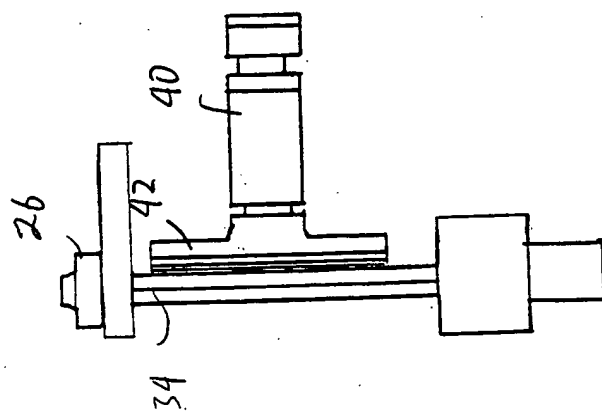


FIG. 4B

INTERNATIONAL SEARCH REPORT

Int. l. Application No
PCT/US 00/17277

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 B65C9/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 772 123 A (CLARK A ET AL) 13 November 1973 (1973-11-13) column 3, line 47 -column 4, line 58; figure 2	1,2
Y	DE 296 06 522 U (TETRA LAVAL CONVENIENCE FOOD) 20 June 1996 (1996-06-20) page 5, line 5 -page 6, line 22; figures 3-6	3-8
Y	DE 31 52 881 A (SCHAEFER ETIKETTEN) 14 July 1983 (1983-07-14) page 6, line 1 -page 8, line 5; figures 1-4	3-8
A	DE 36 09 789 A (ESPERA WERKE GMBH) 1 October 1987 (1987-10-01)	

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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- *P* document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search

11 October 2000

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20/10/2000

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/17277

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3772123 A	13-11-1973	NONE	
DE 29606522 U	20-06-1996	EP 0800995 A	15-10-1997
DE 3152881 A	14-07-1983	DE 3143098 A	11-05-1983
DE 3609789 A	01-10-1987	NONE	